

Titan Montgolfiere Buoyancy Modulation System, Phase I

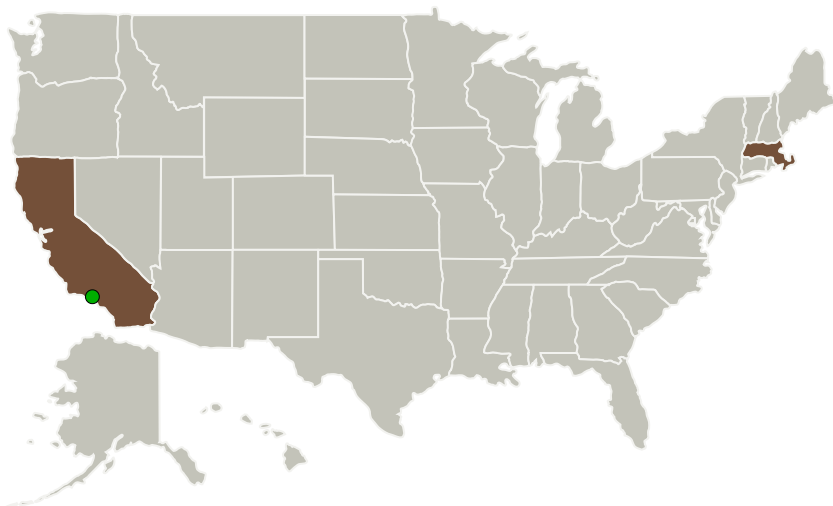
Completed Technology Project (2010 - 2010)



Project Introduction

Titan is ideally suited for balloon exploration due to its low gravity and dense atmosphere. Current NASA mission architectures baseline Montgolfiere balloon systems, which use waste heat from a radioisotope power system to heat balloon interior gases to provide buoyancy. A disadvantage of this approach is that the balloon is unable to make rapid changes in altitude which limits system utility. The feasibility of adding a rapid buoyancy modulation subsystem which uses chemical reactions to provide high heat input to balloon interior gases will be assessed in the proposed effort. Several concepts, including the baseline, will be traded on the basis of heat release capability and mass/volume efficiency in the context of proposed mission requirements, a concept will be selected and refined, and a lab scale demonstration of the reaction mechanism will be conducted in a relevant environment. Aurora's baseline Titan Montgolfiere Buoyancy Modulation System (BMS) concept uses a catalytically piloted burner, which combusts onboard stored oxygen with atmospheric gas, to provide rapid heat input an order of magnitude higher than the balloon's primary heat source. This system is scalable, lightweight, consumes minimal electrical energy, and is capable of providing altitude changes of approximately 200 m in under 60 s.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Transitions	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	2
Target Destinations	2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations

California

Massachusetts

Project Transitions

January 2010: Project Start

July 2010: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138542>)

Project Management

Program Director:

Jason L Kessler

Program Manager:

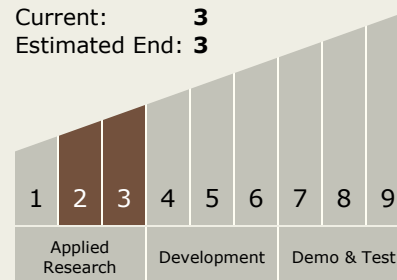
Carlos Torrez

Principal Investigator:

James Sisco

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX14 Thermal Management Systems
 - TX14.2 Thermal Control Components and Systems
 - TX14.2.3 Heat Rejection and Storage

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System